Name:____ Date:____________________

Polynomial Factoring solution (version 643)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 + 6x + 21 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(6) \pm \sqrt{(6)^2 - 4(1)(21)}}{2(1)}$$

$$x = \frac{-(6) \pm \sqrt{36 - 84}}{2(1)}$$

$$x = \frac{-6 \pm \sqrt{-48}}{2}$$

$$x = \frac{-6 \pm \sqrt{-16 \cdot 3}}{2}$$

$$x = \frac{-6 \pm 4\sqrt{3}\, i}{2}$$

$$x = -3 \pm 2\sqrt{3}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $8 + 3i$ and $-2 + 4i$ in standard form ($a + bi$).**

Solution

$$(8 + 3i) \cdot (-2 + 4i)$$

$$-16 + 32i - 6i + 12i^2$$

$$-16 + 32i - 6i - 12$$

$$-16 - 12 + 32i - 6i$$

$$-28 + 26i$$

Polynomial Factoring solution (version 643)

3. **Write function** $f(x) = x^3 - 10x^2 + 31x - 30$ **in factored form. I'll give you a hint: one factor is** $(x-5)$.

Solution

$$\begin{array}{c|cccc} & 1 & -10 & 31 & -30 \\ 5 & & 5 & -25 & 30 \\ \hline & 1 & -5 & 6 & 0 \end{array}$$

$$f(x) = (x-5)(x^2 - 5x + 6)$$

$$f(x) = (x-5)(x-3)(x-2)$$

4. **Polynomial** p **is defined below in factored form.**

$$p(x) = (x+6) \cdot (x+3) \cdot (x-2)^2 \cdot (x-6)^2$$

Sketch a graph of polynomial $y = p(x)$.